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HW

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| 09/683,486      | 01/07/2002  | Andres Bryant        | BUR920010086        | 2808             |

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EXAMINER

GEBREMARIAM, SAMUEL A

ART UNIT PAPER NUMBER

2811

DATE MAILED: 09/10/2003

Please find below and/or attached an Office communication concerning this application or proceeding.

# Office Action Summary

Application No.

09/683,486

Applicant(s)

BRYANT ET AL

Examiner

Samuel A Gebremariam

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

## Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

## Status

- 1) ☒ Responsive to communication(s) filed on 11 July 2003.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

## Disposition of Claims

- 4) ☒ Claim(s) 12-16, 18 and 20 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☒ Claim(s) 15, 17, 19 and 21 is/are allowed.
- 6) ☒ Claim(s) 12-16, 18 and 20 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

## Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☐ The proposed drawing correction filed on \_\_\_\_\_ is: a) ☐ approved b) ☐ disapproved by the Examiner.
- If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

## Priority under 35 U.S.C. §§ 119 and 120

- 13) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some \* c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- \* See the attached detailed Office action for a list of the certified copies not received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).
- a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

## Attachment(s)

- 1) ☐ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449) Paper No(s) \_\_\_\_\_
- 4) ☐ Interview Summary (PTO-413) Paper No(s). \_\_\_\_\_
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other:

**DETAILED ACTION**

***Election/Restrictions***

1. Applicant's election without traverse of group II, claims 12-25 drawn to a semiconductor device in Paper No. 4 is acknowledged.

***Claim Rejections - 35 USC § 102***

2. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

3. Claims 12, 14, 15, 18 and 20 are rejected under 35 U.S.C. 102(b) as being anticipated by Bryant et al., US patent No. 6,159,807.

Regarding claim 12, Bryant teaches (figs. 1, 3 and 4) a transistor comprising: a) a transistor body (42, 53) formed on a substrate (12), the transistor body having a first vertical edge (the edge near the left trench (50)) and a second vertical edge (the edge near the right trench (50)), b) a gate structure (54 and 56) in direct mechanical contact with the transistor body first vertical edge (the vertical edge of layer (53) on the left side); c) a body contact structure (16) adjacent the transistor body second vertical edge and aligned with the gate, d) a bridge (72) over the body (42), the gate (56), and the body contact (16), electrically connecting the gate and the body contact; and e) source (18) and drain (20) regions in the body on opposite ends of the body.

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Regarding claim 14, Bryant teaches (fig. 3a) the entire claimed structure of claim 12 above including the gate structure comprises n-type material (col. 5, lines 36-38) and wherein the body contact structure comprises p-type (col. 5, lines 58-63) material.

Regarding claim 15, Bryant teaches (fig. 3a, col. 3, lines 58-63) the entire claimed structure of claim 12 above including the transistor body (42) comprises a portion of silicon of the silicon-on-insulator layer.

Regarding claim 18, Bryant teaches (fig. 1) the entire claimed structure of claim 12 above including the transistor body (42) comprises source (20) and drain (18) implants into the transistor body, the implants aligned with the edges of the body contact.

Regarding claim 20, Bryant teaches (fig. 3a) the entire claimed structure of claim 12 above including the transistor body first edge (the edge near the left trench (50)) is opposite the transistor body second edge (the edge near the right trench (50)) and wherein the transistor body first edge and transistor body second edge are substantially perpendicular to a top surface of the substrate (12).

***Claim Rejections - 35 USC § 103***

4. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

5. Claims 13 and 16 are rejected under 35 U.S.C. 103(a) as being unpatentable over Bryant.

Regarding claim 13, Bryant teaches substantially the entire claimed structure of claim 12 above except explicitly stating that the gate structure comprises p-type material and wherein the body contact structure comprises n-type material.

Bryant teaches gate structure comprising n-type material (col. 5, lines 36-38) and wherein the body contact structure comprising p-type (col. 5, lines 58-63) material.

Furthermore parameters such as doping type and concentration in the art of semiconductor manufacturing process are subject to routine experimentation and optimization to achieve the desired device characteristics during fabrication.

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to adjust the doping type as claimed in order to form a CMOS device.

Regarding claim 16, Bryant teaches substantially the entire claimed structure of claim 12 above except explicitly stating the thickness of the transistor body between the gate structure and the body contact structure is less than one-third of the length of the gate structure.

Parameters such as thickness and width in the art of semiconductor manufacturing process are subject to routine experimentation and optimization to achieve the desired device characteristics during fabrication.

It would have been obvious to one of ordinary skill in the art at the time the invention was made to adjust the thickness of the transistor body as claimed in order to form a CMOS device.

***Allowance***

7. Claims 17, 19 and 21-25 are allowed.

***Reason for allowance***

8. The following is a statement of reasons for the indication of allowable subject matter: prior art of record does not anticipate or render obvious the limitation of "a gate dielectric between the transistor body first edge and the gate structure, and diffusion barrier layer between the transistor body second edge and the body contact" and the second major difference between the prior art and the claimed invention is "a body comprising widened end portions that are insulated from the gate and the body contact" and the third major difference between the prior art and the claimed invention is "a body contact native oxide layer formed on the transistor body second edge; a body contact structure formed on the body contact native oxide layer aligned to the gate structure and adjacent to the transistor body second edge" for a transistor body.

***Response to Arguments***

9. Applicant's arguments filed on 7/11/03 have been fully considered but they are not persuasive. Applicant argues the Bryant reference does not anticipate claim 12 because the reference does not teach a gate structure in direct mechanical contact with transistor first vertical edge. In response, the gate structure is taken to mean elements (53, 54 and 56). Therefore it is clear that (53) is in direct mechanical contact with the transistor body first vertical edge.

***Conclusion***

10. **THIS ACTION IS MADE FINAL.** Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire **THREE MONTHS** from the mailing date of this action. In the event a first reply is filed within **TWO MONTHS** of the mailing date of this final action and the advisory action is not mailed until after the end of the **THREE-MONTH** shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than **SIX MONTHS** from the mailing date of this final action.

The prior art made of record and not relied upon is considered pertinent to applicant's disclosure. Reference A is cited as being related to transistor structure.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Samuel Admassu Gebremariam whose telephone number is 703 305 1913. The examiner can normally be reached on 8:00am-4: 30pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Tom Thomas can be reached on (703) 305-7646. The fax phone numbers for the organization where this application or proceeding is assigned are (703) 308-7722 for regular communications and (703) 308-7724 for After Final communications.

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Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is (703) 308-0956.

Samuel Admassu Gebremariam  
August 29, 2003

Samuel Admassu  
Gebremariam  
Steven Loh